

Evaluation of Ten Commercial Cultivars of Dendrobium Under Odisha Condition

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ABSTRACT

The present investigation was carried out to study the performance of ten cultivars of Dendrobium orchid viz. 'Parma Violet', 'Jumbo Red', 'Poped Red', 'Ersakul', 'Charming White', 'Victoria', 'Pink Ayami', 'White Eva', 'Airy Peach' and 'Dew White' under shade net house conditions with an aim to find out suitable variety in Odisha. Vegetative and flowering characters varied significantly among the cultivars. Mean performance of the cultivars revealed that 'Parma violet' registered longer leaves (17.13cm). Leaf area (41.17cm²) was recorded larger in 'Jumbo Red'. 'Poped Red' registered more number of leaves (13.67). 'White Eva' exhibited longer spikes (32.70cm) with maximum rachis length (21.3cm). 'Charming White' recorded thicker pseudobulb diameter (13.28mm) and more number of spikes per plant (4.67), whereas 'Airy Peach' and 'Victoria' recorded larger bud and larger flower with more bud diameter (14.14mm) and flower diameter (82.50mm) respectively. Number of pseudo bulb (7.33) girth of spike (3.82mm) was higher in 'White Eva'. Wider (3.77cm) and thicker leaves (2.31mm) were noticed in 'Pink Ayami'. 'Airy peach' being taller plant exhibited higher values with respect to plant height (40.63) whereas 'Dew White' recorded maximum number of floret (8.00). Vase life of 'White Eva' recorded maximum (27.00 days) whereas flowers of Victoria is higher in weight (30.96 g).

Keywords *Dendrobium, Evaluation, Varieties, Growth, Yield*

Orchids are one of the most ecologically and morphologically diverse flowering plants belonging to the family orchidaceae being the second largest of flowering plants in the world comprising about 779 genera and 22, 500-35, 000 species. They have diverse habits with vigorously modified floral structures. In India orchid diversity is represented by 1331 species belonging to 186 genera. (Chandrasekhar 2016). North eastern region of India mainly considered as the treasure house of orchids. Odisha is considered to be one of them. (Mishra 2008). They are a symbol of dignity, lavish beauty as well as a certain myth of unattainability. Among several genera of orchids, Dendrobiums being the diverse genus of orchids are commonly used as a cut flower because of their sturdy stems and distinctive colours (Singh, 2006). The genus Dendrobium is the third largest in the family Orchidaceae, comprising 1184 species worldwide (Leitch et al., 2009). These are most important and popular tropical orchid getting fame as cut flowers in India as well as in the world due to its attractive shape of flowers as well having capacity

to rehydrate after a long distance transport. They still ooze glamour and elegance with just a couple of stems adding a sophisticated touch to floral arrangements in any area. Intensive studies have been made in the field of tissue culture for last 40 years but literature are scarce with respect to production behavior of orchids most particularly dendrobium in different climatic conditions of country. The genetic diversity of the Dendrobium genus is not well known (Wang et al., 2009). Comparative study of different cultivars were also conducted previously in Dendrobium (Sunil and Swati, 2013; Ramachandrudu, 2008; Sagupriya 2012; Mehraj 2014). But region specific research on evaluation of dendrobium orchid is not available particularly for climates of Odisha state. Therefore considerable efforts have been expanded in this aspect and the present paper deals with ten dendrobium varieties on their specific response to different growth and flowering parameters.

MATERIALS AND METHODS

The present investigation was carried out at shade net house of instructional farm, college of Horticulture, Chiplima, odisha during the year 2015-16. The area comes under west central table land zone among 10 agro ecological zones of Odisha. The tissue culture plantlets of ten dendrobium variety viz. 'Parma Violet', 'Jumbo Red', 'Poped Red', 'Ersakul', 'Charming White', 'Victoria', 'Pink Ayami', 'White Eva', 'Airy Peach' and 'Dew White' were brought from Kumar Florist (KF- Bio plant) Bangalore were used as experiment material. The plants were grown in pots placed on raised platform, supplied with 75% char coal and 25% coco peat (V:V) under bench system of cultivation in an area of 50 sq.m. The experiment was laid out in a Randomized Block Design (RBD) with three replications and three spikes per replication. Observations on vegetative parameters like plant height, number of leaves per cane, Internodal space, leaf length and breadth, no. of Pseudobulb, girth of pseudo bulb, physiological trait like leaf area, flowering parameters and Quality parameter like spike length, Rachis length, bud diameter, flower diameter, number of florets per spike and number of flowers per plant, vase life and fresh weight were recorded at active growth period of the crop.

RESULT AND DISCUSSION

The data pertaining to vegetative characters (Table 1) clearly indicate that significant differences exist among the studied varieties. Highest plant height was associated with cultivar 'Airy peach' (40.6cm) which differed significantly from others except 'White Eva' (39.4cm) which was at par with 'Airy Peach'. On the other hand lowest value was recorded in 'Victoria' (21.70 cm). This might be due to genotypic differences between the cultivars and

Table 1. Morphological Character of Cultivars

Name of Variety	Plant Height (cm)	Internodal Space(cm)	No. of Pseudo bulb	Pseudo Bulb Diameter (mm)	No. of Leaves /Cane	Length of Leaves (cm)	Breadth(cm)	Thickness(mm)	Leaf Area (cm ²)
Parma Violet	38.06	3.50	2.67	11.24	7.33	17.13	2.45	1.52	39.99
Jumbored	25.70	1.83	4.33	13.40	8.33	14.97	3.50	1.88	41.17
Popedred	34.88	3.13	3.00	11.58	13.67	13.50	3.60	1.55	22.23
Ersakul	38.20	3.90	3.67	12.62	11.00	12.60	3.47	2.15	22.72
Charmingwhite	35.27	2.23	5.00	13.28	8.67	12.47	2.97	1.64	32.41
Victoria	21.70	2.87	4.00	11.45	11.00	11.77	2.60	1.68	22.53
Pinkayami	28.77	2.70	4.67	12.25	12.00	11.47	3.77	2.31	28.49
White Eva	39.37	2.80	7.33	12.62	13.00	15.87	2.67	0.74	38.94
Airypeach	40.63	2.23	3.67	10.10	6.33	15.10	2.57	1.69	27.72
Dewwhite	28.17	2.50	5.33	10.25	9.00	14.50	2.47	1.35	30.09
Mean	33.07	2.77	4.37	11.88	10.03	13.94	2.99	1.65	31.30
SE(M)	6.435	0.531	1.015	1.587	1.919	1.543	0.379	0.262	4.325
CD at 5%	13.520	1.115	2.132	3.335	4.032	3.241	0.797	0.550	9.087

growing situation and environmental conditions of the plant.(Kumar *et al.* 2015) These findings are in accordance with the report of Roychowdhury *et al.* (2004) in Dendrobium orchids and Thomas and Lekha Rani (2008) in monopodial orchids.

There is no significant variation recorded with respect to internodal space. Leaves are spaced closely (1.83cm) as observed in 'Jumbo Red' which was statistically similar with 'Parma Violet' (3.50cm) whereas 'Ersakul' has marked variation in arrangement of leaves. (3.90cm). The position and orientation of leaves which mainly depends on length of internode which is an important factor that exposes the surface of the plant properly for the photosynthesis. These results confirmed the opinion expressed by Thomas and Lekha Rani (2008) in Monopodial orchids.

Leaf being the major treasure house for photosynthesis decides translocation rate by its length breadth and thickness. Number of leaves recorded maximum in 'Poped Red' (13.67). it was followed by 'white Eva' (13.00) whereas least was recorded in 'Airy Peach' (6.33). Highest and lowest value were recorded with respect to leaf length in 'Parma violet' (17.13cm) and 'Pink Ayami' (11.47cm) respectively. 'White Eva' have appreciable result with respect to no. of leaves (13.00) and length of leaves (15.87cm). However there is no marked difference observed in breadth and thickness of dendrobium cultivars. 'Pink Ayami' have recorded broader leaves (3.76cm) as well as thicker leaves (2.31mm) 'White Eva' have least thicker leaves (0.743). variation in vegetative characters may be due to differential growth rate and their genetic makeup due to which variation in phenotypic expressions occur. Kumar *et al.* (2015).

Maximum leaf area was associated with 'Jumbo Red' (41.17cm²). 'Poped Red' and 'Ersakul' are at par with each other and registered lowest leaf area. The varieties with more breadth and less length is supposed to expose more surface area for photosynthesis. (Barman *et al* 2012 Nair *et al* 2002

and Sagupriya 2012).

'White Eva' and 'Charming white' were vigorous in growth however recorded more number of Pseudo bulbs (7.33) and thicker pseudo bulbs (13.28mm) respectively. Minimum number of pseudo bulbs were recorded in 'Dew White'. (5.33). 'Airy Peach' having thin pseudobulb diameter exhibit lesser value. (10.10mm) which ultimately give rise to lesser number of leaves. similar variation in girth and number of pseudobulb were also reported by Sagupriya (2012) and Thomas and Lekha rani (2008).

The perusal of data on flowering characters (Table 2) indicates that each variety differed significantly from others for all the flowering associated characters. In terms of most important forecasting factor for yield i.e. number of spike per plant was observed to be significantly higher in 'Charming white' (4.7) which remained at par with 'Poped Red' (3.0). on the other hand 'Jumbo Red' exhibited lowest number of spikes per plant (1.00) and remain inferior with respect to yield deciding factors.

Number of floret per spike is an important character which decides the cost of spike. Generally more floret per spike is preferred. In the present study performance of 'Dew White' was better which produced highest number of floret per spike (8.00). It was followed by 'Charming White' (7.33). On the other hand lesser number of florets was recorded with 'Jumbo Red' (4.00) which remain at par with 'Airy Peach' (4.33). Findings of the present study are in close agreement with Sunil and Swati (2013).

Size of individual floret also contributes to the quality of spike. Florets with bigger bud or floret usually looks attractive. In terms of bud diameter and flower diameter and girth of spike which imparts sturdiness to the spike for remaining fresh for long time transport, were differed significantly among different varieties. Data pertaining to flower diameter reveals that, 'Victoria' recorded maximum flower diameter (82.50mm) closely followed by 'Parma Violet'

Table 2. Floral characters of Cultivars

Name of Variety	No. of Spike	No. of Floret	Bud Diameter (mm)	Girth of Spike (mm)	Flower Diameter (mm)	Length of Flower Internodes (cm)	Length of Spike (cm)	Length of Rachis (cm)	Fresh Weight of Spike (g)	Vase Life (days)
Parma Violet	1.33	6.00	11.88	3.79	82.34	2.60	29.63	16.53	19.80	17.78
Jumbored	1.00	4.00	9.77	3.54	63.33	4.07	29.65	13.80	17.49	11.06
Popedred	3.00	6.67	12.42	3.80	52.14	2.23	32.83	9.03	20.05	15.70
Ersakul	2.00	5.67	12.59	2.77	78.46	4.00	27.93	11.47	25.55	22.10
Charmingwhite	4.67	7.33	12.32	2.67	60.09	4.00	26.77	12.73	28.76	19.16
Victoria	1.33	5.33	12.13	2.65	82.50	3.03	22.73	9.37	30.96	21.60
Pinkayami	1.33	5.00	11.62	3.68	57.87	3.00	27.67	9.87	21.60	19.57
White Eva	2.33	5.33	8.26	3.82	62.50	3.53	32.70	21.93	19.83	27.00
Airypeach	2.67	4.33	14.14	3.60	27.91	3.93	27.87	15.87	26.39	22.90
Dewwhite	2.00	8.00	12.41	3.39	39.53	4.00	28.04	13.27	28.35	24.12
Mean	2.17	5.77	11.76	3.37	60.67	3.29	27.11	14.86	23.88	20.10
SE (m)	0.654	1.589	1.613	0.467	5.758	0.277	3.504	2.026	2.57	3.10
CD at 5%	1.373	3.337	3.388	0.981	12.097	0.582	7.362	4.257	6.32	4.74

(82.34mm). Highest bud diameter (14.14mm) with minimum flower diameter (27.91mm) was recorded in 'Airy Peach'. As far as girth of spike and length of flower internode is concerned, no significant variation was recorded among cultivars, however, maximum girth of spike was found in 'White Eva' (3.82mm) which was accompanied by lowest bud diameter (14.14mm). Florets are closely spaced in 'Poped Red' (2.23cm) and minimum florets (4.00) with more flower intermodal space is recorded in 'Jumbo Red' (4.07cm). Similar variation among cultivars for bud diameter, flower diameter and girth of spike was also reported by Mehraj (2014).

Similarly, highest rachis length accompanied by lowest spike length is a desirable character for its quality criteria which ultimately decides the market price. Highest rachis length (32.70cm) with lowest spike length (21.93cm) was recorded in 'White Eva' which remain statistically at par with 'Parma Violet' (29.63cm and 16.53cm). On the other hand 'Poped Red' shows shorter rachis length (9.03 cm) followed by longer spike length (32.83cm). The similar work was also reported by Lekha rani (2002) in *Dendrobium* orchids, Ninitha Nath (2003) in monopodial orchids.

Weight of spike makes it easy for handling. Out of ten varieties studied, 'Victoria' was significantly superior compared to other varieties and recorded increased fresh weight of spike (30.96g) followed by 'Charming White' (28.76g). It may be due to larger size of individual florets which in turn increases the spike weight. In contrast, 'Jumbo Red' showed reduced fresh weight of spike (17.49g), this may be due to lesser number of florets borne in the spike and primarily decides the fresh weight of spike. A wide variation in floral parameters was also earlier reported by Kumar (2013); Sagupriya (2012); Mehraj (2014).

For vase life study, the spikes of individual variety were placed in normal water under ambient condition. A vast variation was recorded among 10 varieties for vase

life. 'White Eva' remain fresh for longer days (27.00 days) as compared to other varieties and recorded highest vase life followed by 'Airy Peach' (24.12 days), 'Ersakul', 'Victoria' and 'Dew White'. On the other hand 'Jumbo Red' shows earliness in wilting and shows minimum vase life (11.06 days). It may be due to content of lesser number of florets which took lesser days for opening as well as wilting. The distinct variation may be due to amount of food reserve in the spikes. The findings were also correlated to Kumar *et al.* (2013).

CONCLUSION

On the basis of result obtained and summarized from present study, it can be concluded that variation in cultivars with respect to growth and yield characters mainly attributed due to genetic and environmental interaction. Average performance of 'Ersakul', 'Charming white', 'Victoria', 'White Eva' and 'Dew White' is excellent having all the growth and flowering potentiality as evaluated suitable for growing in Odisha condition.

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